PROTOCOL

Contaminant Migration Constituents of Potential Concern

Introduction

The following protocol has been developed in order to support the Savannah River Site environmental remediation program. This protocol provides instructions for the development of a list of contaminant migration constituents of potential concern (CM COPCs). It is used to identify constituents that have the potential to migrate from vadose zone soils and into groundwater. This protocol is intended to be used after application of the Unit-Specific Constituents screening. The list of USCs determined in Chapter 4 is the starting point for this analysis.

This protocol is to be applied to all constituents, including radionuclides, except for the following constituents (calcium, chloride, iodine, magnesium, phosphorous, potassium, sodium). These constituents are excluded because they are essential nutrients that are not considered to be toxic and do not have health based limits.

Considerations of contaminant migration are limited to a time frame of 1000 years because, as explained in NRC guidance documents and existing regulations, there is a very large uncertainty associated with predicting conditions beyond this time frame.[1,2,3,4] As needed, additional information from EPAs Soil Screening Guidance[5] is referred to in this protocol, however, it is not repeated in the protocol.

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[1] NUREG 1500, Working Draft, "Regulatory Guide on Release Criteria for Decommissioning: NRC Staff's Draft for Comment, August 1994.

[2] DG-8017, "Radiological Criteria for Decommissioning: Dose Calculations and Surveys", Draft, September 21, 1995.

[3] 10 CFR 20. 1997. "Radiological Criteria for License Termination". Code of Federal Regulations.

[4] 40 CFR 192. 1983. "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings". Code Of Federal Regulations.

[5] "EPA Soil Screening Guidance, Technical Background Document", EPA/540/R-95/128, May 1996.

Details

A. Determination of Unit-Specific Dilution Attenuation Factors (DAF)

Determine a unit-specific DAF using unit-specific input parameters as defined by EPAs Soil Screening Guidance.

B. Calculation and Selection of Unit-Specific Soil Screening Levels

Using the unit-specific DAF value, calculate both a standard SSL and a mass-limit SSL for each constituent. Refer to the EPA Soil Screening Guidance for instructions on how to perform the calculations.

Select the appropriate unit-specific SSL based on understanding of the CSM.

An appropriate surrogate constituent may be substituted if constituent specific information is not available.

C. Comparison of Maximum Value to Unit-Specific SSL Screening

Compare the unit-source maximum value to the unit-specific SSL. Identify the constituents as either passing through this screen or being retained by it.

D. RME Determination Based on CSM

Examine the conceptual site model and empirical data and determine the appropriate RME source term value. (e.g., should the RME be based on the entire soil column [0 to WT] or on a subset representing a hot spot.)

E. Comparison to Unit-Specific SSL Screening

Compare the unit-source RME value to the unit-specific SSL. Identify the constituents as either passing through this screen or being retained by it.

Examine the results of the screening for consistency with what is known about the site. In particular, determine if the contaminants which are predicted to be in the groundwater are present and if there are contaminants present in the groundwater which are not expected based on current soil concentrations.

F. CM COPC List

The constituents retained to this point in the process are identified as CM COPCs. They will be carried forward into a more detailed analysis of contaminant migration which will utilize an appropriate model to determine the expected groundwater concentrations over time. If no CM COPCs have been identified at this point, then the contaminant migration analysis is complete.